

11. Inspect the oil seals. They should be replaced every other time the crankcase is disassembled. Refer to *Bearing and Oil Seal Replacement* in this chapter.

Bearing and Oil Seal Replacement

NOTE

The transmission mainshaft bearing and oil control orifice plate replacement should be entrusted to a dealer as special tools are required for removal and installation of the bearing and the plate. All other bearings can be removed in the normal way as described in this procedure.

1. Pry out the oil seals with a small screwdriver, taking care not to damage the crankcase bore. If the seals are old and difficult to remove, heat the cases as described in Step 2 and use an awl to punch a small hole in the steel backing of the seal. Install a small sheet metal screw part way into the seal and pull the seal out with a pair of pliers.

CAUTION

Do not install the screw too deep or it may contact and damage the bearing behind it.

CAUTION

*There **may** be a residual oil or solvent odor left in the oven after heating the crankcases. If you use a household oven or microwave oven; first check with the person who uses the oven for food preparation to avoid getting into trouble.*

2. The bearings are installed with a slight interference fit. The crankcase must be heated in an oven (or microwave) to a temperature of about 100° C (212° F). An easy way to check the proper temperature is to drop tiny drops of water on the case; if they sizzle and evaporate immediately, the temperature is correct. Heat only one case at a time.

CAUTION

Do not heat the cases with a torch (propane or acetylene); never bring a flame into contact with the bearing or case. The direct heat will destroy the case

hardening of the bearing and will likely cause warpage of the case.

3. Remove the case from the oven and hold onto the 2 crankcase studs with a kitchen pot holder, heavy gloves or heavy shop cloths—it is hot.
4. Remove the oil seals if not already removed (see Step 1).
5. Hold the crankcase with the bearing side down and tap it squarely on a piece of soft wood. Continue to tap until the bearing(s) fall out. Repeat for the other half.

CAUTION

Be sure to tap the crankcase squarely on the piece of wood. Avoid damaging the sealing surface of the crankcase.

6. If the bearings are difficult to remove, they can be gently tapped out with a socket or piece of pipe the same size as the bearing outer race.

NOTE

If the bearings or seals are difficult to remove or install, don't take a chance on expensive damage. Have the work performed by a dealer or competent machine shop.

7. While heating up the crankcase halves, place the new bearings in a freezer if possible. Chilling them will slightly reduce their overall diameter while the hot crankcase is slightly larger due to heat expansion. This will make bearing installation much easier.
8. While the crankcase is still hot, press each new bearing(s) into place in the crankcase by hand until it seats completely. Do not hammer it in. If the bearing will not seat, remove it and cool it again. Reheat the crankcase and install the bearing again.
9. Oil seals are best installed with a special tool available at a dealer or motorcycle supply store. However, a proper size socket or piece of pipe can be substituted. Make sure that the bearings and seals are not cocked in the crankcase hole and that they are seated properly.

BREAK-IN PROCEDURE

If the rings were replaced, a new piston installed, the cylinder rebored or honed or major lower end work performed, the engine should be broken in just

as though it were new. The performance and service life of the engine depends greatly on a careful and sensible break-in.

For the first 5-10 hours of operation, no more than one-third throttle should be used and speed should be varied as much as possible within the one-third throttle limit. Prolonged steady running at one speed, no matter how moderate, is to be avoided as well as hard acceleration.

Following the first 5-10 hours of operation more throttle should not be used until the vehicle has run for 100 hours and then it should be limited to short bursts of speed until 150 hours have been logged.

The mono-grade oils recommended for break-in and normal use provide a better bedding pattern for rings and cylinder than do multi-grade oils. As a result, piston ring and cylinder bore life are greatly increased. During this period, oil consumption will be higher than normal. It is therefore important to frequently check and correct oil level. At no time, during the break-in or later, should the oil level be allowed to drop below the bottom line on the dipstick; if the oil level is low, the oil will become overheated resulting in insufficient lubrication and increased wear.

After 10 Hours Of Operation Service

It is essential that the oil be changed and the oil filter rotor and filter screen be cleaned after the first

10 hours of operation. In addition, it is a good idea to change the oil and clean the oil filter rotor and filter screen at the completion of the 100 hours of operation to ensure that all of the particles produced during break-in are removed from the lubrication system. The small added expense may be considered a smart investment that will pay off in increased engine life.

SERVICE AND ADJUSTMENT

When the engine has been assembled and installed in the vehicle, walk around the vehicle and double check all work. Do not be in a hurry for the first ride. You have invested a lot of time, energy and money so don't waste it by forgetting some little item. *Thoroughly* check and recheck all components, systems and controls. Make sure all cables are correctly routed, adjusted and secured and all bolts and nuts are properly tightened. Position all electrical wires and connectors away from the exhaust system and control levers.

Refer to Chapter Three and perform all maintenance and lubrication procedures including all adjustments. *Do not forget to add oil to the engine.*

This little time spent will prevent a lot of frustration and save not only time but money.

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